(No Model.)

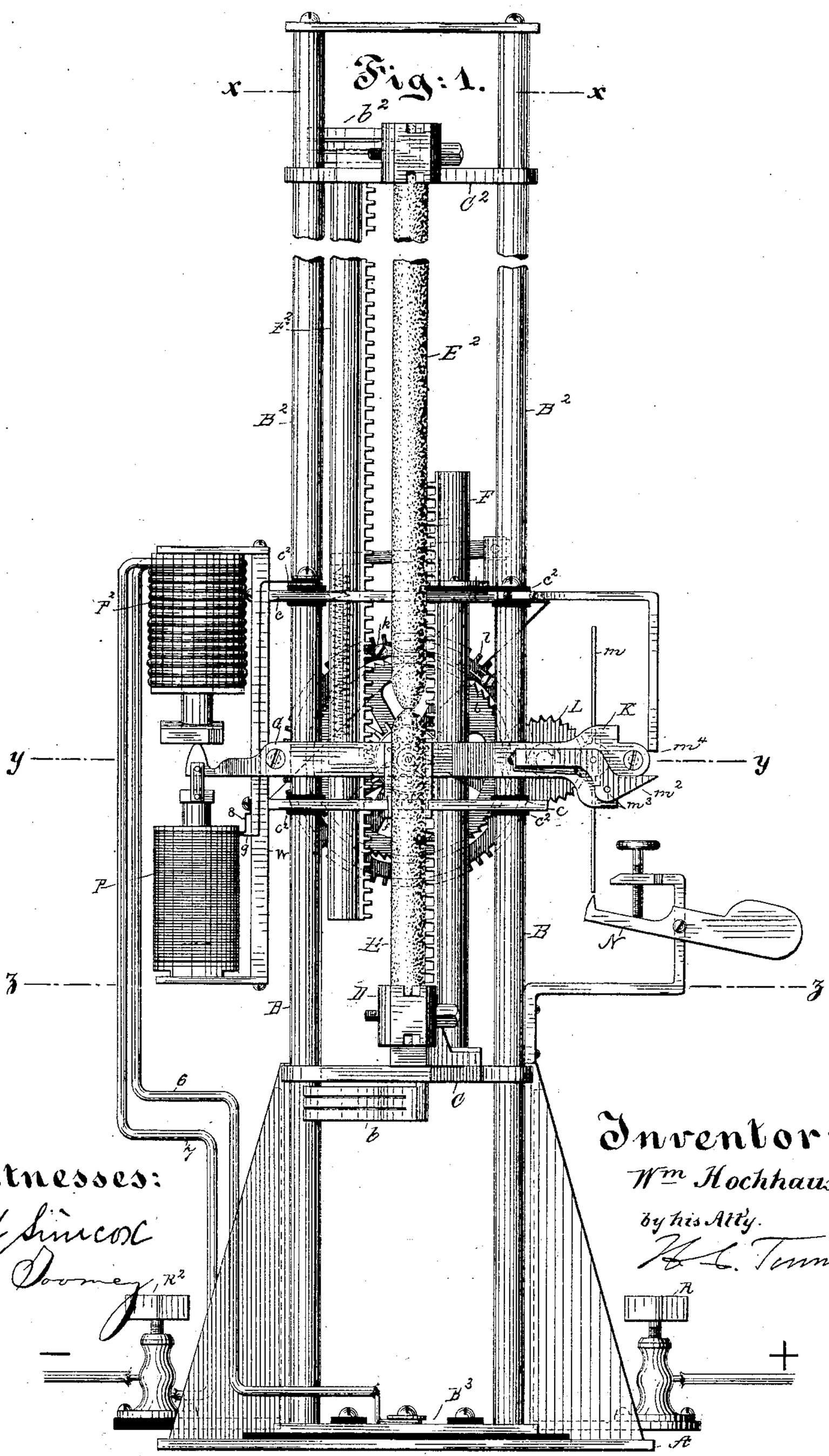
3 Sheets—Sheet 1.

W. HOCHHAUSEN.

FOCUSING ELECTRIC ARC LAMP.

No. 311,074. Patented Jan. 20, 1885.

Fig. 1.



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(No Model.) 3 Sheets—Sheet 2.

W. HOCHHAUSEN.

FOCUSING ELECTRIC ARC LAMP.

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Fig: 2.

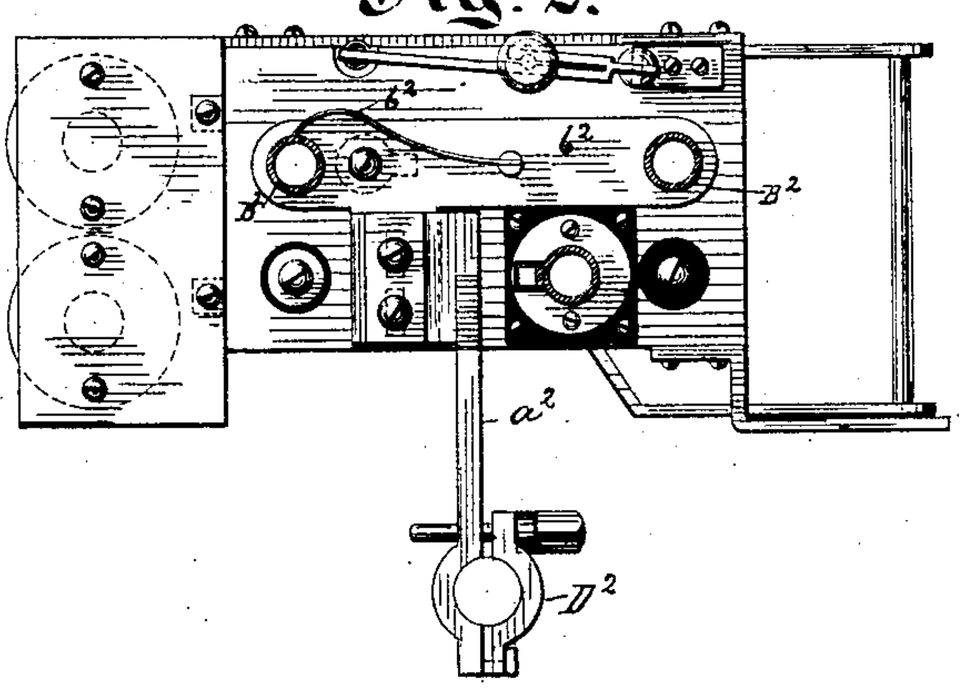


Fig: 3.

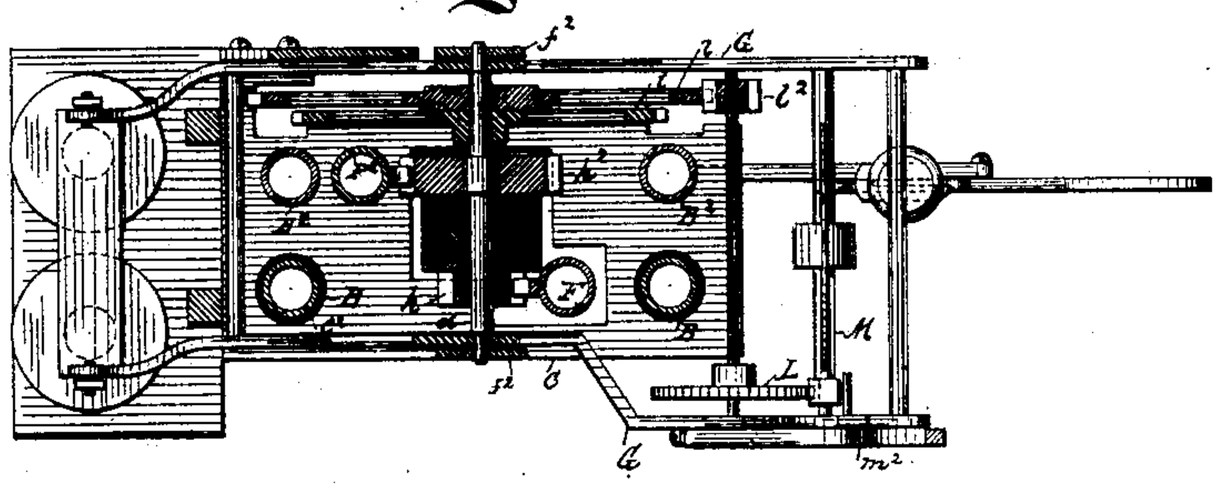
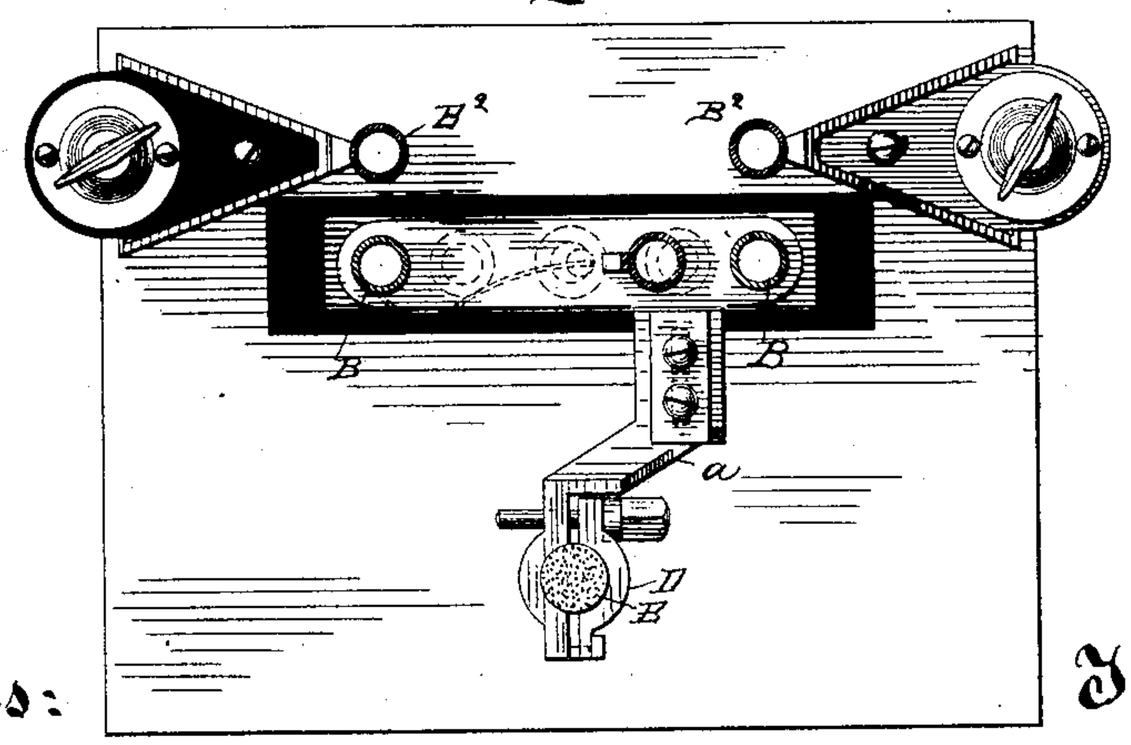


Fig: 4.



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(No Model.) 3 Sheets—Sheet 3.

W. HOCHHAUSEN.

FOCUSING ELECTRIC ARC LAMP.

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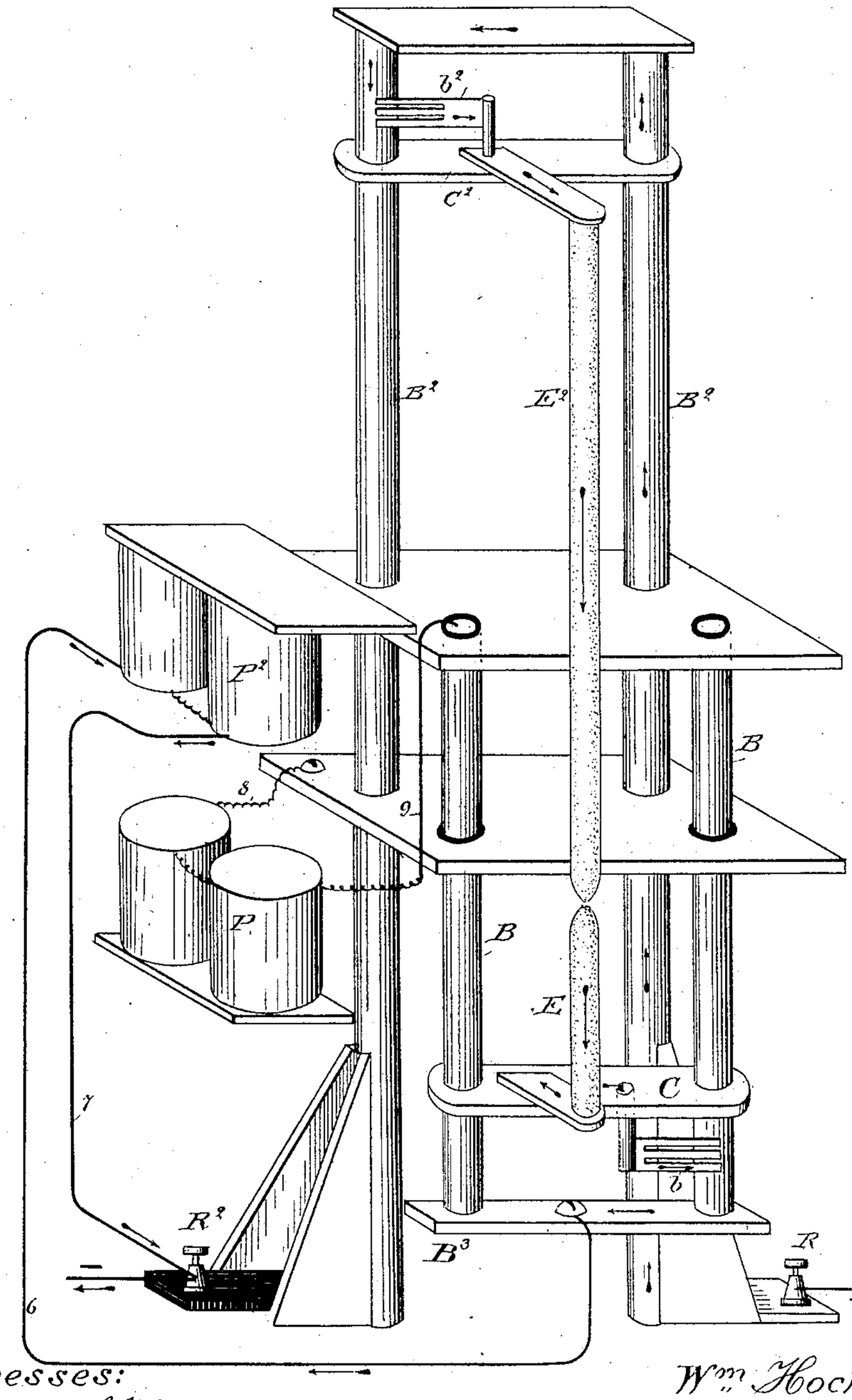
Fig. 5.



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Inventor:
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By his Attorney: W. C. Townsend

UNITED STATES PATENT OFFICE.

WILLIAM HOCHHAUSEN, OF NEW YORK, N. Y.

FOCUSING ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 311,074, dated January 20, 1885.

Application filed March 13, 1884. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HOCHHAUSEN, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Focusing Electric-Arc Lamps, of which the following is a specification.

My invention relates to the construction of focusing electric-arc lamps, and is designed more especially to furnish a simple and reliable lamp adapted for use with reflectors upon steamboats or in other locations.

My invention consists in certain improved constructions and combinations, that will be described in connection with the accompanying drawings, and will then be pointed out in the claims.

In the accompanying drawings, Figure 1 is an elevation of a lamp embodying my invention. Fig. 2 is a cross-section on the line *x x* of Fig. 1. Fig. 3 is a cross-section on the line *y y* of Fig. 1, certain of the parts being shown in plan. Fig. 4 is a cross-section on the line *z z* of Fig. 1. Fig. 5 is a diagram illustrating the circuits and connections.

A indicates the base of the lamp, from which arise two pairs of metallic standards, B B and B^2 B^2. The pair B B are attached to a plate, B^3, supported upon but insulated from the base-plate A, and serve as guides for a sliding cross-head, C, carrying an arm, *a*, from which is supported the carbon clamp or holder D for the lower or negative carbon, E. The cross-head C is preferably of metal, so as to help form an electrical connection between the negative carbon and the standards B B, and is likewise provided with a contact-spring, *b*, bearing on one of said standards to insure good connection. The standards B^2 guide a cross-head, C^2, for the upper carbon, E^2, the latter similarly supported to E by an arm and clamp, a^2 D^2. A spring, b^2, attached to the cross-head C^2, assists in forming the electrical connection between the moving carbon and the standards B^2 B^2 A. The standards B^2 B^2 pass through and assist in supporting horizontal plates *c c*, from which the feed-regulating mechanism is supported. The standards B B pass through and also assist in supporting said plates *c*, but stop with the upper of the two plates, as indicated in Fig. 1. Insulating-washers c^2 serve to insulate the standards B B from said plates and the standards B^2.

F^2 and F indicate, respectively, the carriers that serve to impart movement to or control the motions of or to directly support the positive and negative carbons of the lamp. One is connected to the cross-head C^2, the other to the cross-head C, and each is provided with a rack, as indicated, or with other suitable means whereby it may be made to move under the control of a wheel or wheels of a wheel-work that acts under the control of a feed-regulating lever or frame, G, pivoted on a center between the carriers F^2 F, and serving, when actuated by any suitable magnets, to permit the carbons to feed. The fulcrum or pivot of the frame or lever G is in the present instance formed by a spindle, *d*, as indicated in Fig. 3, upon which the lever or frame may turn freely. The spindle *d* turns in supports F F^2, rising from or carried by the lower of the two plates *c*, to which spindle are secured the wheels or pinions *h* h^2, insulated from one another, and gearing, respectively, with the carriers F F^2. The pinions are proportioned relatively as the rates of consumption of the positive and negative carbons and the carriers engage with said wheels on opposite sides of the spindle, as shown.

As will be obvious, a movement of the spindle in one direction will cause the carbons to move away from one another, while if the spindle be free to rotate in the opposite direction the carbons will be permitted to approach one another by the effort of gravity acting on the upper and heavier of the two carbon-carriers, and at a rate corresponding to their rate of consumption, so as to keep the arc always at the same point. A ratchet-wheel, *i*, secured to the spindle *d*, is connected, through a spring-pawl, *k*, and a wheel, *l*, carrying said pawl, with a suitable retarding device, consisting in the present case of an escapement-wheel, L, and an escapement, K, mounted on rocking arbor M, carrying a vibrating fly, *m*. The arbor M is mounted at one end near the escapement in a lever, m^2, pivoted at m^3, so that when the end of the lever m^2 comes against a releasing-stop, m^4, the said lever will turn on its pivot and carry the escapement out of engagement with the escape-wheel. Under such conditions the train of wheels with which

the carbon-carriers gear may move freely and the carbons may run together.

The detent or stop by which the movement of the fly is controlled is indicated at N.

The escape-wheel is mounted on an arbor pivoted on the lever G, and gearing with the wheel *l* through a pinion, l^2, as shown more clearly in Fig. 3. When the lever G is turned so as to carry the fly *m* out of engagement with the detent N, the carbons may move slowly together under the gravitating influence of the upper carrier and its connected parts, which are made heavier than those for the lower carrier. Such movement is a slow retarded movement under the control of the vibrating fly, the wheels or pinions *h* h^2 being in such case connected with said vibrating escapement-fly through ratchet-wheel *i*, pawl *k*, wheel *l*, pinion l^2, and escapement-wheel L. When the right-hand end of the lever is depressed so as to bring the fly to engagement with pivoted detent N, and the movement is then continued in the same direction still further, the pinion l^2, being no longer free to rotate, will carry the wheel *l*, causing it to rotate in the opposite direction to the direction of the rotation during feed of the carbons, and to thus through the pawl and ratchet-wheel turn the pinions or wheels h^2 in a direction to produce separation of the carbons. The wheel *l* is mounted loosely on the spindle *d*, so as to permit the latter to be turned independently of the retarding devices. The carbon-carriers may therefore be moved freely to a starting position by hand for the purpose of renewing the carbons, the teeth of ratchet-wheel *i* in this case moving freely under the pawl *k*.

P indicates a derived-circuit magnet in a derived circuit of high resistance around the carbons, while P^2 is a magnet of low resistance in a circuit with the carbons, as well understood in the art. The connections are made in any suitable manner. In the present case the circuits are as follows: From binding-post R, which is the positive binding-post, and is in electrical connection with the main frame A and standard B^2, the circuit is through said frame and standards to the upper-carbon holder and carbon, to the lower carbon, to standards B, plate B^3, wire 6, magnet P^2, wire 7, and to the negative binding-post R^2, insulated from the lamp-frame. From the frame and standards A B^2 the derived circuit around the carbons containing magnet P is formed by attaching terminal 8 of said magnet-coils to the bracket W, and thus to the frame, and connecting the opposite terminal, 9, of said magnet with the insulated standard B, connected, as described, with the negative carbon. The core of magnet P is movable and is hung from lever G, as indicated, so that said magnet will tend to disengage the fly *m* from detent N, and permit a feed of the carbons to take place, after the manner well understood in the art. Said magnet acts upon the lever in opposition to a suitable retractor, formed either by properly weighting the opposite end of the lever, or by a retracting-spring—such, for instance, as indicated in Fig. 1—being behind the upper-carbon carrier F^2. The retractor obviously tends to move the lever in such direction as to prevent the feed of the carbons, and to also cause separation of the same. When no current is passing in the lamp or through the coils of magnet P, the tendency of the retractor to act in this manner is overcome by means of a weight or other device acting upon the end of lever G, upon which magnet P acts, and under the control of the magnet P^2. The weight is, in the present instance, formed by the cores of the magnet P^2, which rest upon the lever above the point of attachment of the cores for magnet P. Magnet P^2 is of sufficient power to hold the cores lifted out of range of the lever G while current continues to flow through the carbons. The magnet system thus described is in substance the same as that described in my prior Patent No. 271,456. The carbons are supported at one side of the mechanism by the arms *a* a^2 in such way that the lamp may be set behind a reflector, and the carbons may stand with their ends in front of the reflecting-surface.

The general operation is as follows: When no current is passing, the weight of the cores of magnet P^2 rests upon the lever G, so as to bring the fly *m* out of engagement with the detent N, and to also remove the escapement away from the escape-wheel. The carbons are now together, and when the current begins to flow it passes through them and through magnet P^2. Magnet P^2 now lifts the weight of its cores from lever G, and holds them lifted so long as current flows. The retractor for the lever now acts and moves the same in a direction to bring the detent and fly into engagement, and to remove the lever m^2 from stop m^1. This action produces a separating movement of the carbons, which continues until the magnet P acquires such power as to be able to balance the pull of the retractor.

In Fig. 1 the lever G is shown as moving from one extreme to the other. An arc of a determinate length, dependent upon the adjustment of the parts, having been thus formed, the carbons are now under the sole control of the derived-circuit magnet and its retractor, and the regulation and feed now proceed in a well-understood way.

Various modifications in the form and construction of the various parts will readily occur to those skilled in the art.

My invention is not limited to any particular form or arrangement of feed-regulating magnet, nor to any particular construction or arrangement of retarding wheels or train.

What I claim as my invention is—

1. The combination, with the two carbon-carriers, of the two pinions mounted concentrically, and having the carriers engaging on opposite sides, a retarding device geared to said pinions, and a movable support for the member of the gear-train which connects with the wheel for the pinion-shaft, whereby, when

said support is moved under the action of a magnet and the gear-train is at the same time held from rotation, the pinion-shaft will be turned so as to cause the carbons to move in opposite directions and away from one another.

2. The combination, with the positive and negative carbon carriers, of a feed-regulating train, with which both carriers are connected, a feed-lever, derived-circuit magnet, and retractor acting against said magnet and tending to actuate the lever, so as to separate the carbons, devices whereby said lever may be held in position when the lamp is out of action, so as to permit the carbons to come together, and means whereby when current flows through the lamp said devices may be withdrawn from action and held out of action while the lamp continues to operate, so as to permit the retractor to act unopposed save by the derived-circuit magnet.

3. The combination, in an electric lamp, of a feed-regulating train, positive and negative carbon carriers connected therewith, so as to move toward one another under the control of said train, a feed-controlling lever, and derived-circuit magnet acting on said lever against a suitable retractor, devices acting on said lever while the lamp is out of action, so as to move the lever in the same direction as the derived-circuit magnet, and means for removing said devices from action upon the lever, and holding them out of action while the lamp continues to operate.

4. The combination, with the positive and negative carbons, of the two pinions gearing, respectively, with the carbons or their carriers, a feed-regulating lever controlling the movements of said pinions, a derived-circuit magnet, a weight adapted to rest on the lever when the lamp is out of action, and means for holding said weight away from the lever while the lamp is in operation.

5. The combination, in an electric lamp, of a positive and a negative carbon, a feed-controlling wheel-work connected therewith, a regulating-lever acted upon by a derived-circuit magnet operating in opposition to a retractor, and devices for overcoming said retractor when the lamp is out of action, so that the carbons may run together.

6. The combination, with the two carbon-carriers, of the pinions insulated from one another, and mounted on the same shaft, ratchet and gear wheels, one fixed to said shaft and the other geared to a suitable retarding mechanism, a lever carrying said retarding mechanism, and a feed-regulating magnet in a high-resistance circuit around the carbons acting on said lever in opposition to a suitable retractor.

7. The combination, with the upper and lower carbon carriers, of the two feed-train wheels between said carriers, proportioned as described, and gearing, respectively, with the carriers, and a pivoted frame or lever arranged to turn on a fulcrum passing between the carriers, so as to turn the wheels in a direction to separate the carbons.

Signed at New York, in the county of New York and State of New York, this 12th day of March, A. D. 1884.

WILLIAM HOCHHAUSEN.

Witnesses:

THOS. TOOMEY,

GEO. C. COFFIN.